

## **Connection between a wheel bearing and a wheel carrier**

### **Field of the invention**

The invention relates to the connection between the wheel bearing and the wheel carrier on motor vehicles.

### **Background of the invention**

Engineers have long been working on electronic vehicle control systems in order to improve the ride comfort and safety of motor vehicles. One link in these systems is the wheel bearing, at which the wheel speed is measured and the vertical wheel forces between the tire and the road are continuously determined. To enable the forces between the tire and the road to be determined more effectively, it has been found that the brake caliper must be fastened directly to the fixed part of the wheel bearing. EP 1176409 A1 discloses a wheel bearing with fastening openings to receive the brake caliper. The problem with this arrangement is that the entire braking torque has to be transmitted to the wheel bearing by tightly screwed bolts. For this purpose, the connecting elements, e.g. bolts, must be very strongly dimensioned to enable the unit to be preloaded in a suitably secure manner so as to prevent slippage between the wheel carrier and the wheel bearing, even under extreme loads.

### **Object of the invention**

It is therefore the object of the invention to indicate a connection between the fixed flange of the wheel bearing and the wheel carrier that allows reliable and more accurate force transmission between the wheel bearing and the wheel carrier by simple measures while being easy to implement.

### **Description of the invention**

This object is achieved by the features of the invention.

The essence of the invention comprises introducing additional form-locking connections to transmit the torque from the stationary part of the wheel bearing to the wheel carrier in a specifically targeted manner during braking. These form-locking connecting elements free the bolts between the wheel bearing and the wheel carrier from the task of transmitting the torque, enabling the bolts to be made smaller. As a further advantage, the form-locking elements introduce the torque at a defined location in a specifically targeted manner, enabling this flow of forces to be taken into consideration in designing the wheel carrier. A specifically targeted flow of forces is necessary to satisfy the requirements for lightweight construction in the manufacture of motor vehicles. To avoid stress peaks in the material where necessary, it is also possible to provide a plurality of annular projections on the fixed flange component.

A further advantage of this form-locking connection is that all vertical wheel forces can be transferred in a form-locking manner to the wheel carrier.

A further advantage is achieved by setting the wall thickness of the annular projection so that it is a transition fit and it then expands due to the tightening process (forces applied in the thread flights of the projection) in such a way that the projection becomes an interference fit. This makes it much simpler to fit the wheel bearing in the wheel carrier since the transition fit allows the wheel bearing to be fitted without problems.

#### **Brief Description of the drawings**

Figure 1 shows a perspective view of a wheel bearing with possible ways of fastening the brake caliper from the prior art.

Figure 2 shows a fragment of the wheel carrier and the fixed part of the flange in section.

Figure 3 shows a fragment of a variant of Figure 2.

Figure 4 shows a fragment of the fixed part of the flange bearing and the wheel carrier in section, using a threaded component with fitting surfaces.

Figure 5 shows a perspective view of a connection between the fixed flange component and the wheel carrier.

#### **Detailed description of Preferred Embodiments**

Figure 1 shows a wheel bearing 20 with a fixed flange

component 21, which has openings 22 to receive the brake caliper (not shown), in accordance with the prior art. In this arrangement, the entire braking torque must be transmitted nonpositively between the wheel bearing and the wheel carrier.

Figure 2 shows a fixed flange 2 of a wheel bearing 1. An annular projection 6 is formed integrally on the flange and projects in the direction of the wheel carrier 3. The annular projection 6 engages in a form-locking manner in a fastening opening 5 in the wheel carrier 3. The fixed flange is a component connected to the wheel carrier 3 by a bolt 8a. To introduce the braking torque into the wheel carrier in a defined manner, at least one form-locking connection is required between the wheel carrier 3 and the fixed flange 2.

Figure 3 shows the principle of Figure 2. The annular projection 7 is here disposed on the wheel carrier 3 and projects in a form-locking manner into a fastening opening 4 in the fixed flange component 2. In this embodiment, the bolt 8a can be screwed in from the other side. In this embodiment too, at least one form-locking connection is provided between the fixed part of the wheel bearing and the wheel carrier.

Figure 4 introduces an additional element 9 for the form-locking connection. This sleeve-type element 9 has a thread in the central hole 9a and a fitting surface on the outside diameter 9b. The advantage of this element is that the wheel carrier 3 can be manufactured from lighter material, e.g. aluminum, and the load-bearing points of the

fastening can be made of a stronger material.

Figure 5 shows a form-locking connection 11, 12 outside the fastening openings 4, i.e. away in the circumferential direction. This connection 11, 12 can be in the form of an additional component 11 (e.g. locating pin, stud, etc.). It is possible to make this form-locking connection as a one-piece projection 12 on the flange component 2. The equivalent solution in the form of a projection in the wheel carrier for cooperating with an opening in the fixed flange component is not shown. The brake caliper is held at the brake caliper receptacle 13.

Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.